

Unrecognized Causes of Poor Bid Performance and Engineering Approaches for Improvement

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Abstract

The purpose of this paper is to identify hidden factors in the engineering-marketing interaction that may produce less than optimal contract bids to customers. Of particular interests are the internal assumptions, markups, and allocations within the company's cost system that (when used as reference data for cost estimates) can inflate cost estimation and decrease competitiveness. Of concern is the fact that managers tend to blame poor bid performance on uncontrollable market factors rather than look inward for the problem. Several suggestions are developed to recognize inflated estimated costs and improve the overall strategic pricing process.

Keywords

Strategic Market Pricing; Cost Estimating; Bid Performance

Introduction

Previous studies have investigated the relationships between the engineering and marketing functions in industrial organizations. The results show that the focus and goals of these key departments are not always mutually supportive (Griffin and Hauser 1992; Shaw and Shaw 1998; Fisher, Maltz and Jaworski 1997). This is particularly true in organizations where major functional areas have poor communication, have different views of the purpose of a business, or different views of how that purpose should be achieved (Krishnan and Ulrich 2001; Song and Perry 1992). These differences and lack of mutually supportive effort toward the common goal of bid success may result in reduced business capture results. It is also a concern that data referenced by engineers and marketers in the process of developing contract bids to customers often contain allocations and arbitrary markups that overstate costs. This paper considers these issues and provides suggestions for improvement.

Engineering's Contribution to Strategic Marketing Pricing

In a great many firms, engineers make a major contribution to contract bids through their product design creativity, specification of "purchased materials and components," design of processes, and estimates of the labor and materials that will go into those processes (Michalek, Feinberg and Papalambros 2005). In developing these estimates, an engineer often makes use of data from past manufacturing, external sources, and his or her own technical judgment and applies the results to algorithms representing the companies cost system as created by the accounting function. The resulting engineering estimate of cost of proposed production is forwarded to the marketing department which relies on this estimate to make a final contract bid price decision. In making the final bid price decision, the marketer considers the engineer's estimated cost of goods sold, and other factors including the customer's perceived value, and the likely bids of competitors. From this analysis, the marketer makes a strategic pricing decision and a contract bid is sent to the potential customer. The bid may be a new product opportunity, a new customer opportunity, a routine contract extension on products currently produced, or reconsideration necessitated by changing market realities. In each case, there is a fundamental engineering-marketing interaction that contributes to the strategic pricing decision.

The purpose of this study is to identify hidden factors in the engineering-marketing interaction that may produce less than optimal contract bids to customers. An optimal bid would be one that has the highest likelihood of acceptance, while providing the most profit in light of company capabilities and prevailing market conditions. If a bid is not accepted and a contract awarded, then all the company's investment

in developing that customer opportunity is for naught. For most companies, continued operations directly depend on a steady flow of customer awarded contracts with sufficient profitability to meet corporate goals. Thus the case can be made that determining the price and terms of sales offered to a customer as a bid is among the most important processes that a company undertakes. Any hidden factors that can make the contribution of engineering estimators inaccurate are worthy of in depth consideration.

In this paper, it is suggested that through their own industry experience in engineering and marketing and through discussions with industry buyers, accountants, and manufacturing professionals, a great many firms around the world have lost business for reasons that they do not understand, and selling products at profit margins lower than necessary; and that top managers in firms facing these problems often blame uncontrollable marketing conditions rather than investigating their own company's pricing decision process.

Symptoms of a Problem

When business is lost, it is often easy to blame uncontrollable market factors such as unfavorable economic conditions or unrealistic or unethical bids from competitors. In the case of Chinese competitor, their success is often attributed to an uneven playing field due to low labor costs or their holding the value of their currency unfairly low. Although those indeed may be contributing factors, it takes quite a bit more effort and courage for managers to look inward to weakness in their own company's pricing process. There can be many causes of losing bids to competitors, but inflated estimates of direct cost are a sure path to poor bid performance.

Consider the common situation where a key current customer demands a considerable price decrease at a price point that would result in money lost on each unit produced. The usual reaction would be to call a multidisciplinary team together to investigate a solution. Assuming a solution is found by improving efficiency, renegotiation with suppliers and/or changing the process or materials specified, etc. This success will likely be celebrated, but the success of team's efforts points out that past production was done at higher cost than necessary. Why was the original process designed at less than the best the company was capable of devising?

Example Situation 2-A major potential bid is lost to competition.

One Cause of Inflated Estimates of Direct Cost

A good place to start looking for why costs may be overstated is to consider how the performances of those who contribute to the estimating process are evaluated. Suppose that for example engineers are evaluated by their ability to create the processes they estimated at the direct cost they estimated (or better). It can be argued that this may result in conservative and safe estimates that are easy to meet. In fact, with a conservative estimate (if the business is won in spite of that) the engineer may even have room to later create a cost reduction improvement. Meeting the estimate is rewarded and designing cost improvements is rewarded. If the conservative safe estimates cause bids to be lost, the blame typically goes elsewhere.

Most engineers likely do make their best effort to estimate realistically within reasonable risk, but the problem can still be there due to the engineer's sources of background data. The engineer could unknowingly use exceedingly safe and conservative purchasing estimates of materials and components, manufacturing standards or actual performances that are not optimal, or an accounting cost process with excessive markups, allowances, or inappropriate fixed costs allocation. In increasingly competitive global markets, any or all of these (fairly hidden) conditions may diminish (or destroy) a firm's ability to compete. Again looking to what is rewarded in organizations, purchasing agents are rewarded when they can later purchase at a lower price, and accountants are rewarded when their cost systems do not underestimate actual costs and expose negative variances. (Note: In all three cases here use of the word "reward" just means that the action is likely viewed positively by top management, and would be the type of accomplishment likely to be listed as part of a professional's periodic performance evaluation. The "reward" itself may just be acknowledgement of a job well done, but never the less that psychic reward may be motivation enough to continue a non-optimal approach. Particularly if that type of approach is the "way it has always been done.")

Management's Dilemma

Upcoming sections of this paper will further explore the types of hidden factors that can inflate a cost estimate and ultimately inflate contract bids submitted to potential customers. The foundations for these problems are often imbedded deep in a company's culture, priorities and systems, and therefore difficult to evaluate, even by those who work with them every day. This is where an academic approach can be

enlightening. Academic researchers consider systems in light of those of many types of industries and are less likely to be misled by “the way it has always been done here.” Respecting and holding in high regard “The way it has always been done here” may lead directly to the following:

- Top management unsatisfied with bid performance, but with no idea what the problem is.
- Marketers making strategic price decisions with no idea that the estimated costs are overstated.
- Engineers making good faith estimates with no idea that the market demands that they should be aggressive rather than conservative. Often it seems that: a) the engineering management culture supports conservatism and b) engineering education supports conservatism.
- Purchasing following long accepted procedure with no idea that a certain number of quotes on a material does not assure uncovering the best possible value.
- Accounting following accepted accounting practices with no idea that their decisions within those parameters can significantly impact apparent direct cost.

In no way, it is suggested that any of these professionals are lazy or incompetent. But it is strongly recommended that for many companies in increasing competitive markets “the way things have always been done here” is no longer sufficient.

Standard Costing versus Other Costing Approaches

It is easy to point out issues of the type under discussion within a typical standard cost system. However, many professionals consider a standard cost system obsolete and instead point to the advantages of activity based or actual cost based systems. In this section, the problems that can be inherent in both cost approaches will be discussed. Hybrid systems said to contain the best of both approaches will be shown to also be open to the weaknesses of both approaches when used for formal financial reporting any of these accounting systems may work well. It is when data from these systems are applied to cost estimating for contract bids that caution must be used.

Standard Costing

Standard Costing is an accounting process that assigns

cost standards to each element of the manufacture of a product under normal conditions (Lucus 1997). The “element” could be as simple as the price of one unit of a purchased component, the dollar amount of labor to process a unit, or the cost aspects of meeting a productivity or quality standard. The approach has been popular for decades because it is simple to understand and useful as a control measure. Standard costing has been shown to be prevalent in Malaysia and other parts of Asia (Sulaiman, Ahmad, and Alwi 2004, 2005), the United Kingdom (Lyall and Graham 1993), New Zealand (Guilding, Lamminmaki and Drury (1998), and Dubai (Marie and Rao 2010). Additional research has suggested that it is commonly used in many developing and developed countries (Garg, Ghosh, Hudick, and Nowaeld 2003). As a control measure, actual results are compared to the standards and the resulting variances examined to stimulate improvements (Fleishman and Tyson 1998).

It is easy to imagine how information on standard costs might be used when estimating similar new products. Although it is widely acknowledged that at a particular time actual costs will vary from standard costs, the standard cost is commonly thought of as what the cost should be on average.

The Potential Impact of Standard Cost Allowances and Other Markups

Perhaps the quickest way to demonstrate how standard costs can result in inflated and uncompetitive bids is to provide some examples.

- A purchased component’s standard cost may not be the best possible cost available in the industry.
- A purchased component’s cost is typically marked up by a percentage to allow for shipping, handlings, and perhaps inventory loss or less than 100% quality. Then later in the process percentages are applied on top of these percentages for other allowances. The chaining of percentages can over inflate actual cost. The application of a percentage markup itself may be questionable. Does it cost twice as much to handle or inspect a unit that costs twice as much?
- Standard costs on manufactured products often make allowances for the time that machines or labor is unproductive. The apparent thought being that the customer should pay more if certain supplier processes are unreliable or

supplier labor habitually unproductive. Perhaps the motivation is simply that the standard should reflect reality rather than the best possible industry wide performance. Clearly time and motion studies make an attempt to set standards at levels that reflect good practices in labor utilization, but even these may have allowances added (e.g., allowances for breaks and downtime, etc.). This is particularly true where unions and labor have input into creating a standard cost. The standard may reflect what is actually being done on the manufacturing floor, but that may be totally out of line with what is necessary to be competitive in the global marketplace. With inflated standard costs which are easy for manufacturing to attain, there is little manufacturing management motivation to strive for the global best practices of that industry. Again we find top managers and strategic marketers watching their companies fail in the marketplace with no idea what the problem could be. They often spend millions of dollars on cutting edge computer systems to track actual costs, while putting little effort into strategically improving the bid cost estimating and bid pricing processes.

- In a standard cost system, the allocation of un-assignable fixed costs is typically done by distributing it across all product costs according to a convenient measure common to all products (such as direct labor hours, machine hours, or even floor space used, etc.). For example, if direct labor hours is the measure, then each of the company's products will have to share an amount of the company's total fixed costs based on the amount of labor used in its manufacture. Commonly, accepted accounting procedures require that a company should be consistent in how they allocated overhead, but they do not specify what convenient measure to use. If competitors allocate overhead based on different measures which in itself will cause differences in their apparent standard costs (even if their production processes are identical).

One can easily see how (with standard costs) product lines with high labor content will be allocated more of the overhead burden, as compared to product lines with low labor content. If the accountants had settled on a system that allocated fixed costs based on the

value of equipment used, the more automated low labor content products would carry more of the fixed burden. In aggressively competitive global markets the added (apparent) costs of carrying more share of fixed overhead may itself determine what types of products the company can be competitive at producing. This example demonstrates the real problem of letting the method chosen to spread fixed costs determine what types of products a company is competitive at producing.

One can also easily imagine how an equally capable competitor with low overhead would have an advantage in having less fixed cost to allocate across products. A check would be to consider spinning off a new product process to a location where its costs would only need to reflect the indirect services that were actually necessary for meeting the specific customer needs of that product. It makes little sense to make a product's cost uncompetitive by assigning it shares of indirect costs that it does not benefit from. For example, a company can have a large engineering staff if that extra staff can be quantitatively shown to contribute more to bottom line profit than they cost. But that cost in overhead should be allocated across the products where they are producing benefits. This might be difficult to measure and be resisted by accounting if it is seen as being inconsistent in the fixed cost allocation procedure (Lyal and Graham 1993).

Activity Based Costing

Activity-Based Costing identifies the activities associated with producing a product and allocates a cost to the activity (Innes, Mitchell, and Sinclair 2000). The cost assigned to the activity is then assigned to products according to how much of that activity each requires in its manufacture. Because the focus is on activities rather than products, more of what were previously considered indirect costs can be assigned to the activities incurring them (Cooper and Kaplan 1991). Thus, the underlying assumption of activity based costing is entirely different from that of conventional standard costing systems. The conventional standard costing system assumes that products cause costs. Activity based costing systems assume that activities cause costs and that cost objects create the demand for activities. Activity based costing has evolved from a more accurate method of costing, to a more scientific method of analyzing data for planning, monitoring, control, and cost reduction.

Activity based costing data can contribute to inflated

and uncompetitive bids in much the same ways previously listed for standard costing systems. In addition to the activities identified there will also be an “other” category often representing 10 to 20 percent of the total. The accuracy of unassigned costs placed in the “other” category can in some situations make the difference between winning and losing a bid.

Kaizen Costing

Kaizen Costing is increasingly mentioned in the business literature particularly in Asian operations (Lucas 1997; Sulaiman 2005). Although it is usually applied as more of a cost reduction approach rather than a formal financial reporting approach, its focus on continual process improvement is attractive as a step in the direction of optimization. The more optimal the process the better the data will be as input to bid estimates on similar products. There is some danger that continuous improvements (or in fact any changes to the standard process) may invalidate previous reliability testing. For a company's own proprietary products, a decision would need to be made on what changes could impact product life and reliability. For products produced to customer specifications, the customer would need to be involved in any process change decisions.

Other Costing Methods

The above costing system approaches may be known by other names in individual companies and different regions of the world. Most systems are similar to those discussed above or are adaptations of one or more of these approaches. It is to be expected that they would be applied with company specific allowances and safety margins. It is the arbitrariness of these factors that can cause a problem. Many companies utilize computerized Material Requirements Planning or similar systems where the assumptions, allowances and safety margins are hidden in the system code. These “black box” systems may understate or overstate costs, since bid success on new business opportunities is not their objective.

Caution should also be used when a new product bid involves quantities, values, methods, or markets drastically different than the company normally deals with. Allowances and safety margins acceptable in one market may vastly overstate costs in another.

Details of Strategic Market Pricing

Final pricing decisions are often misunderstood by engineers and accountants (Mills and Tsameny 2000,

Hart 2001; Gleaves, Burton and Bates 2008, Robin 2002). Without question their input is important to the final pricing decision, but their input is quantitative rather than strategic. Strategic pricing starts by considering the engineering estimates of projected costs, but also recognizes customer expectations and the way they assess value. It also considers the value of the customer relationship across all products, potential competitor's reactions, and the long term best interests of the company. International trade issues such as tariffs, exchange rates, and free trade areas are also factored into the final bid offered to the customer (Cateora, Gilly and Graham 2013).

Anyone who considers all these outside factors is doing strategic market pricing regardless of their actual title or department (Gilligan 2012; Negle and Holder 1995). Accountants and engineers can be quite uncomfortable with these “softer” qualitative considerations, but not considering them makes little sense. The price decision is often a marketing rather than sales responsibility, partially because sales representatives typically receive incentive commission based on total sales dollars rather than profitability, and partially because sales representatives do not typically have access to the non-cost factors mentioned earlier. Strategic marketers are usually rewarded like other senior management based on bottom line profitability. Thus product managers or marketing managers should tend to make pricing decisions based on long term profitability (rather than short term gross sales). Under conditions of under utility, marketers may consider any margins that exceed total direct variable cost attractive because they will at least cover some fixed costs. Under normal market conditions marketers decide on product mixes that make the best use of their limited production resources. Classical economic considerations (such as considering the point where marginal costs equal marginal revenue) are typically reserved for very high volume commodity producers.

Some companies (particularly those where accounting or engineering have more power than marketing) only consider cost in making a pricing decision. Often these decisions utilize a simple “cost plus approach” (estimated direct cost plus a markup) (Hanson 1992). In these companies marketing typically only controls areas such as selling and customer service. (Note: By comparison, in a “market driven” company, the marketing function typically includes responsibility for what products are offered to what markets, plus setting price, promotion, and distribution strategy).

There are several weakness in a “cost plus approach” to pricing.

- Where the price offered is less than the customer’s estimate of value, the business will probably be captured, but at less profit than should have been possible.
- Where the price offered is more than the customer’s estimate of value, the business will likely be lost (in a situation where a lesser price could have gained the business and still produced profit).
- Importantly “cost plus” implies (the incorrect philosophy) that the more something costs to produce, the more the customer should be willing to pay for it. An example of this cost plus type of thinking would be where a supplier’s most efficient process is damaged and a less efficient secondary line must be utilized. In this case it would seem quite logical to a cost plus oriented person that the customer should be asked to pay more (i.e., “because it is costing us more to produce”). To a marketer this makes no sense at all, because supplier inefficiency does not create additional customer value.

Marketing teaches that gaining sales by having the lowest price is rarely the best strategy except in true undifferentiated commodities. Competitors can quickly match a lower price and the result is often like a reverse auction where the competitors progressively lower the price until the point where none can be profitable. Instead marketers are told to create unique differential customer value (that competitors cannot easily duplicate) so that price is not the buyer’s first concern. In many highly competitive international markets that is easier said than done. Where the competition is just as highly capable any advantage can quickly be copied. In precision products buyers usually rate quality and reliability as most important and rate price third in importance. In highly competitive global markets true competition comes down to the most capable few, and they will likely all have excellent quality and reliability. Thus, price remains a critical factor in a great many sourcing decisions.

Conclusions: The Potential of Engineering Contributions to Improve Bid Performance

This paper has provided examples of where estimating systems often contain hidden elements that inflate cost

inputs to strategic prices. Identifying and analyzing how these hidden elements can impact various ranges of products would be a valuable engineering contribution. It seems likely that on some types of products the cost impact may be minimal. But on others (perhaps those containing more labor or high cost purchased components) the impact on chaining percentages (marking an element up that will later be part of a greater whole that will again be marked up) may be considerable. If the mark up is justified, the alternative would be removing the element from the cost estimating process and adding it back at the end so it is only marked up once.

Another contribution could come from a redesign of the new product bid process. For customer designed components, an engineer typically develops an estimated cost based on expected volume requirements and other “part print and specification” requirements. Then they provide the total expected cost information to marketing who will then set a bid price. A better approach may be for the marketer to first consider all the “soft” considerations that impact a strategic price, and then provide that target price to the estimating engineer. The estimator can then devise a process that will meet that target cost.

Over time, marketers responsible for setting strategic prices often notice that among the many engineers estimating new product costs, that there is an uneven distribution of estimates that lead to successful bids. As in many professions, questioning another engineer’s judgment is rare. In today’s challenging business climate, however, it would seem that too much is at stake to continue this type of nicety. Somehow every estimate and every bid needs to be the best possible a company is capable to produce.

Engineers and marketers need to understand that their competition may not just be a company in a foreign country. It could very well be a state owned entity that has the financial resources of the entire government and the flexibility to bid any price that will help it reach government goals. The competition may also be a series of foreign channel members who are cooperating in their bid preparation specifically to gain advantage over bidders working independently.

Engineers and marketers should also understand that identifying the best equipment in the world to produce products will only bring their company even with the other competitors who have gone through the same process. Competitive advantage is gained when the best equipment in the world is modified to do even

more.

Goals for Improving Bid Success

Understand your cost system's hidden "assumptions and allocations" in more depth than ever before. This is important for any source of data that influences estimates. Analyze how historical data from these systems are incorporated into estimates for new products, and how much impact they have on what types of products.

Start with a market needs driven target cost, and estimate a process to meet it.

Find a way to make estimating a "coming together of the company's best minds," rather than the result of an individual contributor. Engineers and marketers need to work together to understand customer technical and pricing needs. The traditional procedure of engineers and marketers independently working in series on bid development, not only leads to poor communication and fosters incompatible goals, it almost assures less than optimum new business growth. If economic conditions were better, it may have been possible to resist change and slowly become less and less competitive. Today anything less than a company's best effort seems to quickly lead to a fairly rapid self reinforcing downward spiral.

Assumptions and Limitations

In the above discussion, competitive markets were assumed. If a supplier has a monopoly or is part of an oligopoly, there would be considerably more freedom in pricing. In such cases, failed bids may be due more to issues on the potential customer's side of the interaction. Perhaps they (the customer), or their channel customers, are losing market share due to some of the issues discussed in this paper. In that case, channel integration in cost estimating may make sense. Instead of independently estimating to "a part print, specification, and demand" estimates, it would be considerably more effective to bring together the best minds, not just of one company's estimators, but of the process designers and cost estimators up the channel. Although this would probably involve sharing proprietary information, "sole source just in time purchasing" provides a strong precedent for sharing cost and process information with customers.

The conclusions of this paper expressed in the potential of engineering contributions to improve bid performance section are based on the authors combined experience in engineering management, cost estimating new products, and making strategic pricing

decisions. The experience involved contracts ranging into hundreds of thousands to tens of millions of dollars bid to OEMs in automotive, computer peripherals, office equipment, transportation, medical, heavy equipment, and other industrial products. The informal input of additional engineering, purchasing, and marketing professionals were used to extend the observations to other types of products and companies. The observations and suggestions were based on companies which make frequent bids on new business, and have multiple engineers tasked with process design and estimating costs for new products. A great many companies are of the size and type considered. However, additional research will be needed to explore if these observations can be extended to bidding in radically different buyer seller situations.

For example, there are some countries where sourcing decisions are heavily influenced by historic buyer seller relationships going back generations. In those cases buyers often know that they could change suppliers and save money, but they do not. They may not even put pressure on their older suppliers to reduce prices. In many of these cases, the reason stated is the "importance of tradition," the "importance of relationships" and that "the finished product itself is not price sensitive." Although this situation is not unusual, it is not typical of buyer seller relationships in today's demanding and increasingly competitive markets. Today, most companies would eagerly consider approaches that could improve their rate of bid success and increase profits through additional volume produced.

When making observations in situations where there are hundreds of thousands of individual company realities, the objective is to provide something that will be useful to managers in many of these realities. It is not possible to cover every exception. There is a danger that some readers who have experience in one of these exceptions will reject the approach of this paper. Perhaps it would be better for them to look for ways to adapt the suggestions to their situation. Even for highly profitable unique companies, goals such as incrementally improving rates of bidding success, and improved engineering/marketing cooperation are valid. It is hoped that this paper will stimulate engineering managers and other professionals to envision their own similar ideas for improving accuracy and competitiveness in the bid process.

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